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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 36. February, 1934. No. 422.

THE POLLINATION OF KALMIA ANGUSTIFOLIA[1]

JOHN H. LOVELL AND HARVEY B. LOVELL

THE explosive mechanism of *Kalmia latifolia* L. was described by Conrad Sprengel in 1793, but he supposed that it was designed to secure self-pollination. In 1863 Hasskarl[2] likewise was of the opinion that self-pollination occurs spontaneously in this species. The floral mechanism of *K. angustifolia* L. was discussed briefly by Rothrock[3] in 1867, who observed that the release of the stamens by insects not only threw pollen on the stigma of the same flower, but also upon the stigmas of adjacent flowers.

W. J. Beal[4] seems to have been the first to observe and describe the manner in which the flowers of *Kalmia* are cross-pollinated by insects. He observed the honey-bee and "other Hymenoptera" spring the stamens and become showered with pollen. Flowers covered with netting to exclude insects usually withered without the anthers being set free.

None of the above writers collected or identified the insects which visit either species of *Kalmia*, and in many other respects their observations are either incomplete or inaccurate. In particular the smaller and more northern sheep laurel (*K. angustifolia* L.) has been studied very little. At Waldoboro, Maine, the sheep laurel is very abundant in many neglected pastures, where it is associated with

[1] Published with aid to RHODORA from the National Academy of Sciences.

[2] Hasskarl, J. C. 1863. Über Kalmia latifolia. Bot. Zeit. Leipzig. **21**: 237–239.

[3] Rothrock, J. T. 1867. The fertilization of flowering plants. Am. Natur. **1**: 64–72. This account contains several errors.

[4] Beal, W. J. 1867. Agency of insects in fertilizing plants. Am. Natur. **1**: 254–260.

the earlier blooming rhodora (*Rhododendron canadense*).[4] Farmers often confuse the two shrubs and believe that a single bush bears both kinds of flowers.

The umbel-like corymbs of numerous red flowers of *K. angustifolia* are borne on the shoots of the previous season. The corolla is saucer-shaped, about 12 mm. broad, with a very short tube. There is no noticeable odor. The upper flowers of a corymb may be imperfectly developed, the corolla being white, with no pouches, and the stamens and pistil standing erect and of equal length.

At the beginning of anthesis a small opening appears at the end of the flower-bud, through which the style protrudes for about 3 mm. The capitate stigma is in a receptive condition, and at this stage

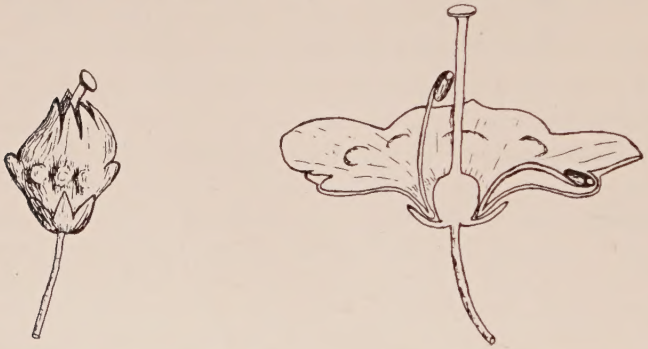

FIG. 1. Bud and expanded flower of KALMIA ANGUSTIFOLIA, × 4.

only cross-pollination is possible. Bees were frequently observed visiting the flowers for nectar at this stage.

The pollen is not discharged until the flower is fully expanded. The ten dark purple anthers are held in ten pouches in the corolla-limb, so formed that they prevent the anthers from springing out prematurely. The filaments are white, flat, and strongly bowed upward, in a state of elastic tension. Many flower clusters, while still in bud, were placed in water, where insects could not have access to them, and kept under observation daily. Since none of the stamens became free, it is evident that the anthers can not release themselves spontaneously.

In the field we have frequently seen the stamens sprung by *Bombus ternarius* and *Andrena vicina*, and more rarely by such small bees as

[4] Lovell, J. H. and H. B. Lovell. Pollination of Rhodora. RHODORA, **34**: 213–214.

Andrena claytoniae. A large bee when alighting on the flower first touches the projecting stigma with the ventral part of its body, and as it inserts its proboscis between the filaments and the corolla tube to gather nectar, its legs set free the stamens and a cloud of pollen is thrown over its body. Upon microscopic examination the hairs on the ventral side of the body of such bees were found loaded with pollen. The hairs on the base of the filaments may cling to the legs of the insects and aid in releasing the anthers. When a filament is touched with a needle, the anthers spring upward, scattering a little cloud of white pollen from two large pores at the apex of the anther. The stamens then stand erect for two or three hours, with their anthers in contact with the style, about three millimeters below the stigma, after which the filaments bend backward and the anthers again rest on the corolla.

The light, dry pollen may be carried by a gentle breeze a distance of a foot or more to other flower clusters, so that cross-pollination by the aid of the wind may occur as in Erica and Calluna. Autogamy is not probable, but it is not excluded.

Nectar is secreted sparingly between the base of the filament and the corolla tube. In a great number of flowers no trace of it could be discovered, but in a few flowers it was moderately abundant. This accounts for the comparatively small number of insect visits received by the bloom. Only 12 to 18 insects were usually captured during two hours of collecting. Though an apiary was located only a third of a mile away, not a single honey-bee was seen visiting the bloom, but in the same pasture many of them were gathering nectar from white clover. On the base of the corolla there are a dozen or more dark red triangular spots which possibly may serve as honey guides.

Insect visits to the sheep laurel are so rare that a few observations might easily lead to the conclusion that they are not numerous enough to effect pollination. Not a single species of Diptera was captured, and there were only a few visits by butterflies. Diurnal clear-winged hawk-moths were seen to probe the flowers occasionally, but since they do not alight are probably of no assistance in pollination.

The most common visitor is *Bombus ternarius*, and on a day following a heavy rain they were so abundant that most of the fully expanded flowers were found to have had their stamens sprung. *Andrena vicina* was also a very common visitor. Long continued ob-

servations show that the inflorescence of *Kalmia angustifolia* is effectively cross-pollinated by bees.

The following visitors were taken on the flowers from June 21 to July 12 at Waldoboro, Maine.

APOIDEA: Bombus ternarius Say ♀ ☿; B. terricola Kirby ☿; B. vagans Sm. ☿; Psithyrus ashtoni Cr. ♀; Andrena vicina Sm. ♀; A. claytoniae Rob. ♀; A. sp. ♀; Augochlora confusa Rob. ♀; Nomada florilegus Lovell & Ckll. ♀; Cilissa americana Sm. ♀; Colletes mesocomus Swenck ♀ ♂ (This bee has been found only on this flower and at Waldoboro).

LEPIDOPTERA—Butterflies: Argynnis aphrodite Fab.; Colias philodice Godt.; Melitaea nycteis Doubl. Moths: A clear-winged hawk-moth (not captured), probably Hemaris diffinis.

COLEOPTERA—CERAMBYCIDAE: Leptura chrysocoma Kirby.

Waldoboro, Maine.

NOTES ON THE SPRING FLORA OF THE COASTAL PLAIN OF SOUTH CAROLINA NORTH OF GEORGETOWN[1]

C. A. Weatherby and Ludlow Griscom[2]

Attracted by the glowing reports of a friend of the wealth of bird and plant life in the vicinity of Myrtle Beach, Horry Co., South Carolina, the junior author took a cottage there, and spent a month's vacation from April 4 to May 2, 1932. The senior author motored south via Wilmington, North Carolina, arrived at Myrtle Beach April 17th, and left on April 23rd for Charleston, collecting a few plants northeast of Georgetown en route, and examining a portion of the Elliott Herbarium at the Charleston Museum. On his return north he swung inland through Columbia, and collected a few additional species, not found near Myrtle Beach, on the inner edge of the coastal plain, chiefly in Lexington Co.; and a few more on the outer edge of the Piedmont in Saluda Co. These are listed in a separate section beyond. The junior author spent practically all day every day afield.

The area chiefly investigated, however, was a narrow strip along the coast from the North Carolina line at Little River to the estuary at Georgetown, formed by the confluence of the Waccamaw, the Pee Dee and the Black Rivers. The limit inland was Conway on the Waccamaw River.

The chief excuse for this paper is that no literature in existence

[1] Published with aid to Rhodora from the National Academy of Sciences.

[2] In type long prior to the publication of Small's Manual of the Southeastern Flora, and only partially revised to date.

can give the prospective visitor to this little explored area any adequate idea of what he may expect to find and what he should look for. The works of those great early explorers Walter (according to Coker, chiefly the upper part of Berkeley Co.) and Elliott (chiefly nearer Charleston) are useful mainly in supplying a list of specialties, first class modern topotypical specimens of which are badly needed in practically all the herbaria of the country. Ravenel, for years the director of the historic Charleston Museum, published an unannotated and admittedly incomplete check-list of the plants of South Carolina in 1882, but scarcely any one living could translate this list correctly in terms of the modern segregates as now understood, and it would still be anybody's guess as to how many of them would occur along the coastal strip north of Georgetown. There is no evidence that Ravenel himself ever explored north of the Santee Canal just below Georgetown.

Porcher's "Catalogue of Phaenogamous Plants and Ferns of St. John's, Berkeley Co.," though worked out with unusual care for its time, was published in 1847. Coker's "Plant Life of Hartsville, Darlington County," 1912, though modern in nomenclature, thorough in most respects, and useful in distinguishing habitats, does not give times of flowering and, covering a small region only, is far from giving a comprehensive idea of the flora of the Coastal Plain.

The most serviceable paper for our purposes proved to be the second edition of the flora of Wilmington, North Carolina (a region floristically similar), published in 1886 by T. F. Wood and Gerald McCarthy. The junior author copied from this list all the more southern herbaceous species recorded as blooming before May 1. It is an interesting commentary on our state of knowledge that, of the plants actually collected by us in South Carolina, less than 50% could have been expected on the basis of this list.

For these reasons little attempt has been made in the systematic portion of the paper beyond to indicate the species previously unrecorded from the State. In most cases their occurrence could be inferred as a matter of common sense. In other cases we find old and fragmentary specimens in the Gray Herbarium from South Carolina, though we are not aware of any definite published record, and often they were originally distributed under some other name. In the present state of our knowledge, therefore, whether or not a given species has been definitely recorded from the State has no significance

unless a genuine range extension is involved or unless we are dealing with so rare and little known a plant that any additional collection deserves emphasis. We have endeavored to call attention to such cases.

The outstanding feature of interest about the coastal plain of northern South Carolina is the extensive areas of a striking white sand pine barren, a formation which contains many peculiar and local species, some of them endemic. This type of soil is best known botanically around Wilmington, North Carolina, but extends southward to the Santee River in the form of a series of discontinuous islands, which contain both wet and dry areas. The famous Venus'

Photograph by Mary R. Walcott

FIG. 1. South Island, Georgetown, showing SABAL PALMETTO.

Fly-Trap (*Dionaea muscipula*) is probably the best known plant confined to these areas in wet portions, and *Lupinus villosus* and *Robinia nana* are striking species characteristic of the particularly dry areas of pure white sand.

An important topographic feature in the South is the character of the coast line. Where the coast consists of a series of sounds or bays with a fringe of outer islands and beaches, plants of a southern type tend to extend northward on these outer islands, which have a slightly more moderate winter climate. Thus the cabbage palm (*Sabal Palmetto*), so characteristic of the outer islands around Charleston, was growing luxuriantly on South Island, east of Georgetown

and on the south side of the estuary, but only three stunted trees were seen on the southern tip of North Island. Nestled in the hollows of the dunes on Pawley's Island, about half way between Georgetown and Myrtle Beach, we found the striking shrub, *Osmanthus americana*, which is apparently absent on the straight coast north of this point, but reappears on the outer islands of the North Carolina coast. Similarly, the saw palmetto, *Serenoa serrulata*, occurs on the islands in Back Bay, Virginia, but is unknown on the mainland.

A few words can be devoted to the main habitats of the region and their more characteristic plants. The outer beaches can be dismissed with a brief mention, as they furnish practically no spring-flowering species. The striking sand-binding grass is *Uniola paniculata*, the dried panicles of which persist over the winter. *Myrica cerifera* was, of course, ubiquitous, varied with stunted clumps of *Ilex vomitoria*. Here and there patches of *Xanthoxylum Clava-Herculis* offered a formidable barrier to further progress. It was in bud, but never actually in bloom during our visit.

As a general statement the country might be described as open sandy pine woods, with or without an admixture of deciduous trees. Here and there were stretches of open pine lands normally wet, with many characteristic plants. Every mile or so along the coast was a depression with running water, the drainage in the majority of cases into ponds just back of the ocean. These depressions were locally called swashes, draws or bottoms, and contained a much richer soil, with a richer and more varied woodland and dense thickets and tangles. These bottoms and the wet pine lands provided the only showy displays of herbaceous plants in bloom.

They furnished, however, an interesting reversal of the normal situation in the coastal plain of New Jersey and Massachusetts in that one *ascends* out of the richer draws to the white sand barrens above. It is apparent, therefore, that this special white sand formation is deposited upon and overlaps a more generally distributed type of soil below, which is exposed here and there by water action or some other agency.

The other remarkable feature of these draws was the mingling of characteristic Austroriparian types with plants which we should regard as characteristic of the Piedmont belt farther inland, or of the north. Along the water courses, *Cardamine bulbosa* grew with *Stellaria uniflora* and clumps of *Ranunculus palmatus*, shaded by *Ben-*

zoin aestivale. Patches of Bloodroot and *Pedicularis canadensis* grew side by side with the showy *Zephyranthes,* shaded by thickets of southern species of *Ilex* and *Smilax.* It is difficult to account for the presence of these plants in a region the drainage of which is *not from* the Piedmont Belt, and separated from it by the Austroriparian cypress swamps of the Waccamaw River.

In the mixed pine and deciduous woods the spring display was afforded by shrubs and trees. Flowering dogwood was in full bloom the middle of April, preceded by the Plums (*Prunus umbellata* and *angustifolia*). The lovely little Azalea (*Rhododendron atlanticum*) was generally distributed, its pink flowers resembling those of the northern *nudiflorum* and, like them, appearing before the leaves. *Magnolia virginiana,* an occasional bush of *Vaccinium virgatum,* and *Lyonia nitida* were conspicuous a little later. The only dominant violet was *Viola septemloba.* The chief *Carex* was *C. nigromarginata.* The chief grasses were *Melica mutica* and *Stipa avenacea,* which were just being replaced by *Danthonia sericea* at the end of the month.

In the pure stands of dry pine woods at a slightly higher elevation the flora was much more restricted. The chokeberry (*Pyrus arbutifolia*) was the only dominant shrub in bloom early in the month. All three lupines occurred rarely and locally in colonies, and a curious prickly little Euphorbiaceous species (*Cnidoscolus stimulosus*) was occasional to frequent the last week in April.

Six to ten miles north of Myrtle Beach there was a remarkable area of white sand barrens that looked for all the world like a patch of desert. No pine grew here, but a gnarled and stunted oak in open stands. The species was indeterminable, as the tree was far behind the other kinds, and did not bloom or develop leaves during our stay. There was an occasional small tree of *Vaccinium arboreum.* The curious *Ceratiola* grew only in this habitat. Underfoot there was practically no herbaceous vegetation of any kind. An occasional shrub of the dwarfed *Vaccinium virgatum* var. *tenellum* with either pink or whitish flowers, and a very few patches of the little *Robinia nana* with lovely flame-pink flowers provided a little color. There was an occasional plant of the decumbent *Asclepias humistrata* in bud, at this season chiefly reddish with no green chlorophyll apparent, and patches of a little pink-flowered *Tradescantia* just coming into bloom. But for the most part as one looked around, there was nothing but a waste of white sand under the stunted trees. We

should like to follow the seasons through in this most striking and peculiar habitat.

In two respects we were unfortunate in the season. There had been no winter at all in South Carolina, and the spring vegetation had started abnormally early. A severe cold wave in mid-March drove the temperature down to 14° and killed most of the vegetation, and it then remained abnormally cool until the end of April. The natives declared the spring to be about two weeks late the first week in April and certainly the bird migration was abnormally late and disrupted.

A worse handicap was, however, the severe drouth; the country was dried up. The wet pine lands were mostly baked as hard as iron, in addition to being ditched, and the only plants to come up in places were on the edges of these drainage ditches. Undoubtedly the floral display in these wet pine lands was greatly reduced both in quantity and variety by these two factors combined. Moreover severe and destructive forest fires raged throughout the country, and some of the area will not return to normal for many years, if ever again. On April 7th the junior author was forced to suspend botanizing after lunch, as the town of Myrtle Beach was threatened with destruction. For five hours every able-bodied adult worked with desperation to prevent the fire from jumping from the woods to the beach. Three times the fire, borne on a strong west wind, advanced through the woods in a column of flame 50 feet high and made a spectacular jump of 150 yards to the boardwalk, setting it and adjacent houses on fire. A week later the junior author made a first attempt to visit the marshes around Georgetown Landing. Several square miles were on fire here simultaneously, and making a turn in the woods we were startled to see a column of fire 8 feet high coming rapidly down the road to meet us. The car was turned around with barely a second to spare. In this particular fire 18 square miles were affected, and the botanizing was of course destroyed.

The compensation was the relative accessibility of the cypress swamps, which ordinarily would have been 3–5 ft. under water. The Waccamaw River, instead of a raging torrent, was a placid stream on which we often went boating. We admired the stately cypress, the giant gums and other trees, and the floating patches of *Nymphozanthus sagittaefolius*. The banks of the river were overhung with *Styrax americana* and *Leucothoe racemosa* with extraordinarily elongated racemes. Here and there the scarlet berries of *Smilax Walteri* gleamed

among the delicate greens, but the common *Smilax* was *S. laurifolia* with its persistent green berries and tough leathery leaves. The only flowers along the river banks that were not white were *Wisteria frutescens* and *Bignonia capreolata*. In the depths of the swamp there was little at this season but species of *Carex* just coming into condition and where there was a little sunlight a clump of Iris. None of the trees were in condition to collect.

Even less can be said of the great marshes in the estuary of the Waccamaw River, with their abandoned rice fields. August and September would be the proper months to botanize these marshes. The cane brakes (*Arundinaria*) were varied with cat-tail marshes, but the dominant plant was *Zizaniopsis miliacea*. The Golden Club (*Orontium*) was practically the only aquatic in bloom.

In the list which follows, stations not otherwise placed are in Horry County. The single exception is Georgetown, which may be assumed to be in the county named for it.

It will be observed that two series of numbers have been used. For convenience, the junior author's numbers have been applied to all specimens collected by him or by us both; the senior author's numbers have been used for all collected by him after leaving Myrtle Beach.

The first set of our collection is deposited in the Gray Herbarium. Duplicate sets have been sent to the New York Botanical Garden, the U. S. National Herbarium and the University of Pennsylvania. A set of the woody plants is in the herbarium of the Arnold Arboretum and a selected set of all groups, containing some unicates, in the herbarium of the junior author.

Botrychium dissectum Spreng., var. obliquum (Muhl.) Clute. Dry open deciduous woods, near Myrtle Beach, no. 16,394.

Plants all sterile, variable in leaf form, some individuals with oblong-ovate and obtuse, others with linear-oblong and acute, segments. The former condition has passed as *f. onciduse* (Gilbert) Clute, the latter as *f. elongatum* (Gilbert & Haberer) Weatherby.

Pinus palustris Mill. Frequent in white sand, often forming pure stands. The young seedlings, with their very long needles proceeding from the ground level, resemble basal rosettes of a *Xerophyllum*. Our specimen from near Myrtle Beach, no. 16,398.

Pinus serotina Michx. On normally wet barrens where such herbaceous plants as *Pinguicula* and *Sarracenia flava* flourish; less

common than the preceding. Our specimen from near Burgess P. O., no. 16,397.

Pinus Taeda L. Frequent in sand: our specimen from near Myrtle Beach, no. 16,399.

Taxodium distichum (L.) L. C. Rich. Dominant in all swamps of the region; our specimen from marshes along the estuary of the Waccamaw River, Georgetown Landing, no. 16,396.

Sagittaria lancifolia L. Wet places, frequent; our specimen from marshes along the Waccamaw River, Longwood Landing, no. 16,395.

Panicum yadkinense Ashe (det. Hitchcock). Alluvial woods along Waccamaw River opposite Sandy Island, no. 16,412.

Panicum lancearium Trin. (det. Hitchcock). Sandy roadside ditch, 2 miles south of Georgetown, no. 16,418.

Panicum roanokense Ashe (det. Hitchcock). Wet pine barrens south of Socastee, no. 16,423.

Not reported from South Carolina in Hitchcock & Chase's Monograph.

Panicum chamaelonche Trin. Dry grass-land at edge of golf-links, Myrtle Beach, no. 16,406. Sandy roadside ditch, 2 miles south of Georgetown, no. 16,417.

Not reported from South Carolina in Hitchcock & Chase's Monograph of Panicum. In addition to our collections, there is in the Gray Herbarium a sheet collected near Charleston, *B. L. Robinson*, no. 64, May 4, 1912.

Panicum laxiflorum Lam. Dry sandy roadsides, 4 miles south of Myrtle Beach, nos. 16,419; 16,420. Alluvial woods along Waccamaw River opposite Sandy Island, no. 16,410.

In no. 16,419 the leaves are quite as ciliate as in much of *P. xalapense*, but the spikelets are even larger than the dimensions given for *P. laxiflorum* (mostly 2.5 mm. long). No. 16,410, growing in shade, is a more slender plant than the others, with leaves 5–7 mm. wide, but in other respects appears the same. The species is not reported north of Georgia by Hitchcock & Chase; it appears to us, however, that *P. xalapense* is doubtfully separable.

Panicum consanguineum Kunth. Wet pine barrens south of Socastee, no. 16,422.

Panicum commutatum Schultes. Dry sandy pine woods, 2 miles south of Myrtle Beach, no. 16,421.

Panicum oligosanthes Schultes. Dry sandy roadside in pine barrens, 2 miles north of Myrtle Beach, no. 16,416.

Panicum Joorii Vasey. Dark rich wooded swamp, Longwood Landing, no. 16,403.

Zizaniopsis miliacea (Michx.) Doell & Aschers. Long abandoned rice-fields along Waccamaw River, Georgetown Landing, no. 16,415.

Phalaris caroliniana Walt. Sandy bank of causeway through old rice-fields, Georgetown Landing, no. 16,413.

Stipa avenacea L. Dry pine barrens, 2 miles north of Conway, no. 16,401; south of Myrtle Beach, no. 16,409.

One of the commonest species of barren open woodlands.

Agrostis scabra Willd. (*A. hyemalis* of recent manuals, not Walt. See Fernald, Rhodora **35**: 207 (1933).) Wet pine barrens, one mile south of Little River, no. 16,424.

In the Gray Herbarium there is no material of this species from any point south of Pennsylvania; in view, however, of the scanty representation of the flora of the southeastern states, this extension of the range given by Prof. Fernald is probably not so startling as it appears.

Sphenopholis. Edge of ditch in loose roadside soil, causeway through old rice-fields, Georgetown Landing, no. 16,411.

A puzzling plant, combining characteristics of *S. obtusata* and *S. pallens*,[1] but not satisfactorily referable to either.

Typically, in *S. obtusata*, the first glume is obtuse, the second glume is 1.7–2.3, usually 2, mm. long, as seen in profile cuneate in outline, tapering evenly from the narrow base to the truncate apex where it is widest, and about half as broad as long—that is, when spread out, the glume is as broad as long. The margins are yellowish-white and chartaceous. The lemmas are obtuse and the paleas nearly or quite equal them in length. The spikelets are mostly short-pedicelled and the panicle therefore dense.

In *S. pallens*, the first glume is typically acute. The second is 2.5–3, mostly about 2.5 mm. long, as seen in profile oblanceolate to obovate, acute, widest distinctly below the tip, less than half as broad as long (about 0.5–0.7 mm.),—i. e., longer than broad when spread out—and with a silvery white, hyaline margin. The lemmas are acute and sensibly longer than the paleas. The pedicels of the

[1] Here used in a broad sense to include typical *S. pallens* (*S. aristata* (S. & M.) Heller) in which the upper floret is awned, *S. intermedia* Rydb., and the common plant with awnless lemmas which passes as *S. pallens* in current manuals and is perhaps *Aira pallens mutica* of Muhlenberg's Catalogue. See Scribner, Rhodora **8**: 139 (1906) and Hitchcock, Bartonia **14**: 34 (1932). Scribner's guess that *A. pallens mutica* refers to *S. pallens* of manuals appears to us *a priori* more probable than Hitchcock's that it refers to a specimen of *S. nitida* preserved in a cover of mixed material labelled *A. pallens* in the Muhlenberg herbarium. The cover also contains a specimen of awnless *S. pallens* and Muhlenberg, who distinguished *S. nitida* (as *Aira mollis*) in his Descriptio, would not have been likely to confuse the two.

spikelets tend to be comparatively long, producing a relatively loose panicle.

Both groups vary. Many southern specimens of *S. obtusata* have the second glume proportionally narrower and less truncate than in typical material; and in *S. pallens,* the form described by Rydberg as *S. intermedia* has the second glume only 2 mm. long and broader and more obtuse than in the more usual and typical form. So far as the second glume is concerned, there is little but texture to separate these two extremes. The comparative length of lemma and palea is also variable and *S. pallens* may have nearly as dense a panicle as *S. obtusata.* Our plants are large for the genus, with stout, densely tufted culms 7–8 dm. high,[1] leaves up to 6 mm. wide and nearly 2 dm. long, and densely flowered panicles 14–16 cm. long. In the spikelets, the first glume is acute. The second is 2.5 mm. long, as seen in profile narrowly obovate, distinctly acute, widest below the apex, and 0.7–1 mm. broad (i. e. 1.4–2 mm. when spread out). Although the flowers are young (the stamens not yet exserted) the glumes already show a somewhat chartaceous texture. The lemmas are sharply acute and slightly longer than the paleas; in both florets of a spikelet their mid-nerves are excurrent into a short, straight awn, 1 mm. or less long.

Geographic location, texture of second glume and rather long palea would suggest reference of our plant to *S. obtusata.* But in other characters it leans rather to *S. pallens,* which, to our minds, it most resembles.[2]

In its terminal awns it is unique among the specimens we have seen. This character is of little taxonomic significance in most grasses; it happens, however, to be extremely rare in this section of *Sphenopholis.*

Wherewith, and pending collection of further material, we leave our plant as a *forma inquirenda.*

Trisetum pensylvanicum (L.) Beauv. Swampy wooded bottom, north of Conway, no. 16,400.

Danthonia sericea Nutt. Dry pine woods, two miles north of Conway, no. 16,402.

A frequent and handsome grass.

[1] This vegetative vigor may be accounted for by the disturbed soil in which the plants grew.

[2] Similarly, *S. intermedia,* originally described and named as falling between *S. obtusata* and *S. pallens* has most of the essential characters of the latter, differing chiefly in the smaller florets and more obtuse second glume.

Melica mutica Walt. Rich pine woods south of Myrtle Beach, no. 16,408. Occasional, often in large colonies.

Festuca octoflora Walt., typical; not the plant of the northern states which has passed under this name. See Fernald, Rhodora **34**: 209 (1932). Sandy roadsides, Myrtle Beach, no. 16,425.

Poa autumnalis Muhl. Border of rich wooded bottom, north of Myrtle Beach, no. 16,407.

Hordeum pusillum Nutt. Bank of causeway through old rice-fields, Georgetown Landing, no. 16,414.

Arundinaria macrosperma Michx. Edge of cypress swamp near Longwood Landing, no. 16,405; old rice-fields along Waccamaw River, Georgetown Landing, no. 16,404.

Eleocharis tricostata Torr. Dry sandy ground in little-used roadway, north of Myrtle Beach, no. 16,452.

Eleocharis tuberculosa (Michx.) R. & S. Ditch in wet pine-barrens south of Socastee, no. 16,432.

Scirpus divaricatus Ell. Swampy bottom, south of Murrell's Inlet, Georgetown Co., no. 16,448.

Carex tribuloides Wahlenb. Edge of wooded swamp north of Myrtle Beach, no. 16,434.

Carex incomperta Bicknell. Margin of pond at golf links, Myrtle Beach, no. 16,443.

Material in the Gray Herbarium precisely similar to our specimen, collected at Aiken by Ravenel, has been named *C. incomperta* by both Mackenzie and Wiegand. It differs, however, from what may be called the norm of that species in its narrow leaves (c. 1 mm. wide) and its small perigynia (c. 2.5 mm. long) with beaks as a rule only ¼–⅓ the length of the body, and ventral faces only finely and faintly, or not at all, nerved. In these latter respects it suggests *C. interior;* from that, however, it differs in the proportionally broader, more deltoid and more stipitate bodies of the perigynia.

It is the sort of variant which, in a group where specific lines are clearer and more stable, might well be treated as a geographic variety.

Carex atlantica Bailey. Wet swale in pine barrens, north of Myrtle Beach, no. 16,466.

Carex seorsa E. C. Howe. Low woods along creek, 4 miles south of Myrtle Beach, no. 16,454.

Carex bromoides Schk. Edge of swamp, 2 miles south of Myrtle Beach, no. 16,463.

Carex laevivaginata (Kükenth.) Mackenzie. Edge of brook, 2 miles south of Myrtle Beach, no. 16,459. Occasional.

Carex stipata Muhl., var. uberior Mohr. Swampy bottom, 3 miles north of Conway, no. 16,430; river swamp, Waccamaw River near Longwood Landing, nos. 16,440, 16,441.

Larger in all its parts, but otherwise not separable from *C. stipata* and best treated, as originally by Mohr, as a geographic variety of that species. In the last collection, kindly determined for us by Mr. Mackenzie, the leaves are deep bluish-green and the very young panicle almost as open and branched as in species of the section *Indocarex*, which superficially the specimens much resemble.

CAREX LEPTALEA Wahlenb., var. HARPERI (Fernald) W. Stone. Dark wooded swamp, Longwood Landing, no. 16,465; wet woods along creek, 4 miles south of Myrtle Beach, no. 14,456.

CAREX STRICTA Lam. In dense stools, swamp at Longwood Landing, no. 16,439.

Not previously reported south of North Carolina. There is, however, another extant specimen from the southern coastal plain. In the Kew Herbarium is a sheet labelled as collected by Asa Gray at Apalachicola, Florida, and the type of *C. semicrinita* C. B. Clarke, Kew Bull. Misc. Inf. Add. Ser. **8**: 70 (1908). A photograph of this specimen and perigynia from it were procured by Mr. Mackenzie in 1922; he then determined it as certainly *Carex stricta*. Dr. Gray apparently kept none of this collection; there is no trace of it in the Gray Herbarium now.

CAREX NIGROMARGINATA Schwein. Dry mixed woods, 2 miles south of Myrtle Beach, nos. 16,461, 16,460; sandy pine barrens, 5 miles south of Myrtle Beach, no. 16,435.

The last number, growing in the loose white sand which is a particularly characteristic soil of long-leaf pine-lands, is not typical, showing a distinct transition toward var. **floridana** (Schwein.) ~~n. comb.~~ (*Carex floridana* Schwein. Ann. Lyceum N. Y. **7**: 66 (1824)), which appears to be only a variety with long stolons, pale scales, less fibrillose sheaths, and blunter pistillate scales. We find other transitional specimens in the Gray Herbarium, in particular the material from southeastern Virginia which is the only basis known to us for records of *C. floridana* from the Gray's Manual region.

CAREX TRICEPS Michx., var. SMITHII Porter (*C. caroliniana* Schwein.). Alluvial woods along Waccamaw River, opposite Sandy Island, no. 16,447.

In its extreme state appearing distinct from *C. triceps*, but connected with it by numerous transitions in the northern part of its range.

CAREX DEBILIS Michx. Open woods at edge of rich creek-bottom, 4 miles south of Myrtle Beach, no. 16,457; swampy woods along Waccamaw River above Sandy Island, no. 16,446.

South Carolina is the type locality of *C. debilis;* our material well represents the typical form. In Mackenzie's recent treatments of *Carex,* the species is recorded north to New Jersey; but the northern specimens show a distinct approach to var. *Rudgei.* Small's statement of the range of *C. debilis* "South Carolina to Florida and Louisiana" (Fl. s e. U. S. 2nd ed., 212 (1913)) seems better to represent the range of the strictly typical form.

Carex oxylepis Torr. & Hook. Rich woods at edge of creek-bottom, 4 miles south of Myrtle Beach, no. 16,455.

Carex styloflexa Buckley. Swamp in rich bottom, 4 miles south of Myrtle Beach, no. 16,437.

Carex striatula Michx. Dry open mixed woods, 2 miles south of Myrtle Beach, no. 16,458.

Carex amphibola Steud. Open deciduous woods, Pine Island Road, west of Myrtle Beach, no. 16,426.

In the Gray Herbarium there are no specimens of this species from any station between the District of Columbia and northeastern Florida.

Carex abscondita Mack. Open deciduous woods, Pine Island Road, west of Myrtle Beach, no. 16,428; rich wooded river bank, Waccamaw River, below Longwood Landing, no. 16,445.

Carex Walteriana Bailey. In ditch, wet pine barrens south of Socastee, no. 16,433.

Carex verrucosa Muhl. Roadside ditch in wet pine-lands near Burgess P. O., no. 16,438.

Muhlenberg's name is here applied, in accordance with Mackenzie's treatment in Small, Fl. s. e. U. S., ed. 2, 1324 (1913), to the stout, very glaucous plant with stiffly erect pistillate spikes and glaucous, nerved perigynia represented by our specimens. Mackenzie seems happily to have resolved the confusion hitherto attending the use of this name and of *C. glaucescens* Ell.

There is no specimen of *C. glaucescens* in Elliott's herbarium. There is a specimen of our plant labelled "Carex Verrucosa Schkur flaccae affin: Flor. Aprile in fossis circiter 20 mil: Charleston juxta viam ad Jacksonborough." To this Olney, who at one time worked over Elliott's Carices, has added: "C. verrucosa Muhl. glaucescens Ell."; and he distributed South Carolina material like Elliott's specimen under the latter name with *C. verrucosa* as a synonym. This failure to distinguish *C. glaucescens,* definitely described by Elliott as with "spicis . . . . demum pendulis; corollis . . . . enerviis" has doubtless been responsible for some of the later confusion.

As interpreted by Mackenzie, *C. verrucosa* is a species strictly of the southern coastal plain, ranging, as indicated by the specimens in the Gray Herbarium, from South Carolina to Texas (Wright, without no.).

Carex riparia Curtis, var. impressa S. H. Wright. Marshes along estuary of Waccamaw River, Georgetown Landing, no. 16,451.

Carex comosa Boott. Edge of artificial pond at Golf Club, Myrtle Beach, no. 16,453.

Carex intumescens Rudge. Rich river swamp, Waccamaw River below Longwood Landing, no. 16,442; open deciduous woods, Pine Island Road, west of Myrtle Beach, no. 16,429.

Carex Smalliana Mackenzie (*C. folliculata*, var. *australis* Bailey). Roadside ditch and in moist woodland, Pine Island Road, west of Myrtle Beach, no. 16,427; swampy alluvial woods, Ball Creek, Waccamaw River, no. 16,449.

A striking species in the field, in aspect intermediate between *C. folliculata* and *C. Collinsii*.

Carex gigantea Dewey. Swamp along Waccamaw River, opposite Sandy Island, no. 16,450.

Sabal Palmetto (Walt.) R. & S. South Island and south side of the Georgetown estuary; three stunted trees on North Island, Georgetown Co.

No specimens were taken, but a photograph was made by Mrs. Robert Walcott, and is reproduced in fig. 1, with her kind permission.

Orontium aquaticum L. River marshes above Georgetown, no. 16,471.

Arisaema triphyllum (L.) Schott. Edge of swamp 4 miles south of Myrtle Beach.

Forms with the dilated portion of the spathe blackish-purple within, short-acuminate, not constricted below (no. 16,467); with green, acuminate spathes (no. 16,468); with green spathes abruptly contracted to a mucronate apex (no. 16,469); and with green spathe intermediate in shape between the two preceding (no. 16,470) grew together at this station. No. 16,468 with dilated portion of spathe 4 cm. wide and 9 cm. long, answers fairly well to the description of *A. acuminatum* Small, but here plainly passes into the common form of *A. triphyllum* which is well represented by our no. 16,467.

Lemna cyclostasa (Ell.) Chev. Shallow artificial pond on golf-links, Myrtle Beach, no. 16,472.

Eriocaulon compressum Lam. Cypress swamp, Waccamaw River below Conway, no. 16,473.

Tradescantia rosea Vent. Dry, sandy oak-barrens, 6 miles north

of Myrtle Beach, no. 16,474. The narrow-leaved plant described as *Cuthbertia graminea* Small.

Juncus Elliottii Chapm. Common in wet ditches throughout pine barrens south of Socastee, no. 16,475.

Amianthium Muscaetoxicum (Walt.) Gray. Edge of swampy depression in pine barrens, 10 miles northeast of Georgetown, no. 16,482.

Nothoscordum bivalve (L.) Britton. Rich bottom, Myrtle Beach, no. 16,484; rich pine woods, Pine Island, no. 16,483.

Smilax Bona-nox L. Thicket along ditch near Georgetown Landing, no. 16,481.

Smilax rotundifolia L. Rich bottom woods, 4 miles south of Myrtle Beach, no. 16,476.

Smilax Walteri Pursh. Rich bottom, near Socastee, no. 16,477; river swamp, Waccamaw River below Peach Tree, no. 16,478.

Smilax laurifolia L. Low woods along creek, 4 miles south of Myrtle Beach, no. 16,479.

Smilax laurifolia L., var. bupleurifolia Delile ex A. DC. Banks of Waccamaw River below Peach Tree, no. 16,480.

Aletris farinosa L. Wet pine barrens one mile north of Little River, no. 16,485.

Hypoxis hirsuta (L.) Coville, var. leptocarpa (Engelm. & Gray) Brackett. Rich woods along road to Pine Island, no. 16,488; edge of creek, 4 miles south of Myrtle Beach, no. 16,487.

Hypoxis micrantha Pollard. Wet pine-lands near Burgess P. O., no. 16,489.

Apparently a rare and local species.

Zephyranthes Atamasco (L.) Herb. Sandy pine woods south of Myrtle Beach, no. 16,490.

A characteristic and most attractive plant of moist creek-bottoms.

Iris virginica L. (det. Small). Swampy woods, Longwood Island, Waccamaw River, no. 16,493; edge of cypress swamp, Socastee, no. 16,492; river swamp, Conway, no. 16,495.

Variable in color and shape of floral parts.

Spiranthes gracilis (Bigel.) Beck. Wet pine barrens south of Socastee, no. 16,496.

Spiranthes vernalis Engelm. & Gray. Wet pine barrens south of Socastee, no. 16,497.

Calopogon barbatus (Walt.) Ames. (*C. graminifolius* Ell.) Pine-lands, 10 miles northeast of Georgetown, no. 16,498.

A charming little plant.

Malaxis unifolia Michx. Sandy pine woods, 6 miles north of Myrtle Beach, no. 16,499.

Salix nigra Marsh. Roadside ditch, Conway, no. 16,506.

Salix longipes Anders., var. Wardi (Bebb) Schneid. Open bushy swamp, Longwood Island, no. 16,517.

Myrica cerifera L. Sandy swamp near beach, 10 miles north of Myrtle Beach, no. 16,505.

One of the commonest shrubs of the region.

Carya cordiformis (Wang.) K. Koch. Edge of swamp near Longwood Landing, no. 16,503.

Alnus rugosa (Du Roi) K. Koch. Edge of swamp, 2 miles south of Myrtle Beach, no. 16,511.

Castanea pumila Mill. Edge of swampy depression, 10 miles south of Myrtle Beach, no. 16,504.

Quercus laurifolia Michx. Cypress swamp, Myrtle Beach, no. 16,501.

Quercus marilandica Muench. Woods, 2 miles south of Myrtle Beach, no. 16,509.

Quercus virginiana Mill. Woods, 2 miles south of Myrtle Beach, no. 16,512.

Quercus virginiana Mill., var. geminata (Small) Sargent (det. E. J. Palmer).

Quercus rubra L., var. triloba Ashe. Woods, 2 miles south of Myrtle Beach, no. 16,510.

A rather tall shrub or low rambling tree, sand-dune hollows, Pawley's Island, Georgetown Co., no. 16,519.

Morus rubra L. Rich woods, 2 miles south of Myrtle Beach, no. 16,520.

Celtis laevigata Willd. Bank of river marsh, Georgetown Landing, no. 16,516.

Asarum arifolium Michx. Rich open woods, 2 miles south of Myrtle Beach, no. 16,500.

Rumex hastatulus Baldw. Roadside weed, Myrtle Beach, no. 16,508.

This and *Linaria canadensis* are the commonest weeds of the region on roadsides and in old fields.

Rumex verticillatus L. River marsh, Georgetown Landing, no. 16,515.

Nymphozanthus sagittaefolius (Walt.) Fern. Ditch in marshes, near Georgetown Landing, no. 16,529; Waccamaw River, off Longwood Landing, no. 16,528.

A water-lily so strikingly distinct in aspect as this local species of the southern coastal plain is a joy to the collector.

Sagina decumbens (Ell.) T. & G. A weed in waste ground at Longwood Landing, no. 16,524.

Stellaria uniflora Walt. Edge of small stream by golf links, Myrtle Beach, no. 16,523.

Silene antirrhina L. Sandy roadside, Myrtle Beach, no. 16,522.

Ranunculus palmatus Ell. Edge of water-course in swampy bottom, 3 miles north of Conway, no. 16,526.

Ranunculus pusillus Poir. Swampy bottom, 3 miles north of Conway, no. 16,527; damp ditch, 2 miles south of Myrtle Beach, no. 16,525; river swamp, Longwood Landing, no. 16,531.

A common species in suitable habitats throughout the region.

Clematis crispa L., var. Walteri (Pursh) Gray. Edge of rich bottom along creek, 4 miles south of Myrtle Beach, no. 16,530.

Magnolia virginiana L. Along roadside 3 miles east of Conway, no. 16,521.

One of the most deliciously fragrant of North American flowers.

Sanguinaria canadensis L., var. rotundifolia (Greene) Fedde. Dry mixed woods, 2 miles south of Myrtle Beach, no. 16,533.

This southern variety, characterized by the nearly or quite entire margins of the lobes of the leaf (which are sometimes narrowly oblong) and by the coarse and inconspicuous venous reticulation of the under surface, is represented in the Gray Herbarium by the following collections in addition to ours:

Georgia: rich woods west of Americus, Sumter Co., July 31, 1901, *Harper*, no. 1146 (type collection of *S. rotundifolia* Greene). Florida: rich woods, limestone outcrops, near Marianna, Jackson Co., April 12, 1929, *E. J. Palmer*, no. 35,295. Tennessee: rich, wooded slope, Hollow Rock Jc., Aug. 27, 1922, *Svenson*, no. 365 (leaves only). Missouri: woods in rich soil, near London, alt. 1400 ft., May 23, 1911, *Lansing*, no. 2945.

Corydalis micrantha (Engelm.) Gray. Sandy field south of Murrell's Inlet, Georgetown Co., no. 16,532.

In this region apparently occurs only as a weed in neglected fields.

Podophyllum peltatum L. Rich bottom woods, 4 miles south of Myrtle Beach, no. 16,534.

Lepidium virginicum L.? Sandy roadside near golf club-house, Myrtle Beach, no. 16,541. Radical leaves pinnate.

Coronopus didymus (L.) Smith. Roadside, Georgetown Landing, no. 16,543.

Sisymbrium altissimum L. Dry sandy roadside, Myrtle Beach, no. 16,546.

Arabidopsis Thaliana (L.) Schur. Low depression in deep woods, Longwood Landing, no. 16,544.

Cardamine bulbosa (Schreb.) BSP. Wet woods, 2 miles south of Murrell's Inlet, Georgetown Co., no. 16,542.

Cardamine pensylvanica Muhl. Swampy bottom, 2 miles south of Murrell's Inlet, Georgetown Co., no. 16,545.

Dionaea muscipula Ellis. Pine-lands, 10 miles northeast of Georgetown, no. 16,539.

A small colony, the only one seen. Because of the drought and the frequent fires in the pine-lands, the species was apparently, and at least for the time being, nearly absent from the region visited.

Drosera brevifolia Pursh. Roadside ditch in pine-lands, 10 miles northeast of Georgetown, no. 16,538.

A neat and attractive little plant, the slender scapes rising from a small and very symmetrical rosette of leaves, the white flowers 1 cm. in diameter.

Sarracenia purpurea L. Wet pine barrens, 1 mile north of Little River, no. 16,536.

Sarracenia flava L. Moist pine barrens, Georgetown Co., 10 miles southwest of Conway, no. 16,535; wet pine barrens, 1 mile north of Little River, no. 16,537.

Frequent in wet pine-lands. *S. rubra* was also observed, but not collected.

Fothergilla Gardeni Murr. Swampy depression in pine woods, 10 miles north of Myrtle Beach, no. 16,547; low pine-lands, 2 miles southwest of Georgetown, no. 16,548.

At least at this season, when the leaves are undeveloped, we found it impossible to recognize the proposed segregate (*F. parvifolia* Kearney), which is supposed to occur in pine-lands of the coastal plain.

Pyrus arbutifolia (L.) L. f. Sandy pine woods, Myrtle Beach, no. 16,550.

Ubiquitous and in full bloom the first week in April.

Pyrus angustifolia Ait. Rich pine woods, south of Myrtle Beach, no. 16,552.

Prunus umbellata Ell. Rich pine woods, Myrtle Beach, no. 16,551.

Prunus angustifolia Marsh. Roadside near Longwood Landing, no. 16,549.

Laurocerasus caroliniana (Mill.) Roem. In dense thickets in sand-dune hollows, Pawley's Island, no. 16,553.

Crotalaria rotundifolia (Walt.) Poir. Dry sandy pine barrens, weed in roadway, Golf Club, Myrtle Beach, no. 16,556.

Lupinus perennis L. Dry oak barrens, 6 miles north of Myrtle Beach, no. 16,561.

Lupinus diffusus Nutt. Dry loose sand, Sandy Island, Georgetown Co., no. 16,559; dry sandy pine-lands, 4 miles north of Georgetown Landing, no. 16,560.

Lupinus villosus Willd. Dry loose sand, 1 mile north of Myrtle Beach, no. 16,562.

In its simple leaves and red flowers quite unlike the conventional lupine: and forming with the preceding and several similar species of southern Brazil a conspicuously marked section of the genus.

Trifolium carolinianum Michx. Waste ground, Longwood Landing, no. 16,568.

Robinia nana Ell. Sandy oak barrens, 3 miles north of Myrtle Beach, no. 16,555.

A low, straggling shrub with brilliant deep-pink flowers.

Robinia albicans Ashe. Dry sandy pine barrens, 6 miles south of Myrtle Beach, no. 16,565.

Our specimens agree well with authentic material of *R. albicans* lent us from the National Herbarium through the kindness of Dr. Maxon. Especially and characteristically in the wand-like shoots unbranched except at apex, the sparse loose pubescence of pedicels, rachises and calyx, and the entire absence of bristles, do they accord with it. *R. albicans* was described from the mountain region of southwestern North Carolina and so far as we know has not hitherto been reported elsewhere. The occurrence of the same species in the Alleghanies and the coastal plain is not to be too confidently expected, but is by no means without precedent. Doubt is cast on Rydberg's surmise that *R. albicans* is a hybrid of *R. Pseudo-Acacia* and *R. Boyntoni* by the occurrence of the supposed hybrid at a locality where neither of its putative parents is known.

Wisteria frutescens (L.) Poir. Rich wet bottoms near Socastee, no. 16,554; thickets along Waccamaw River, Georgetown Landing, no. 16,564.

Amorpha fruticosa L. Roadside ditch near Burgess P. O., no. 16,563.

Vicia angustifolia (L.) Reichard, var. segetalis (Thuill.) Koch. Roadside weed, Georgetown Landing, no. 16,557.

Oxalis filipes Small. Dark rich swampy woods near Longwood Landing, no. 16,567.

Plants weak, slender and delicate, partly decumbent.

Oxalis stricta L. Abundant on sandy roadsides, Myrtle Beach, no. 16,568.

Stout, erect, with large flowers.

Tamarix gallica L. Abundant on sand dunes, Pawley's Island, Georgetown Co., no. 16,576.

Polygala lutea L. Sandy roadside excavation, 2 miles southwest of Georgetown, no. 16,569.

Ceratiola ericoides Michx. In pure white sand in oak barrens, 4 miles north of Myrtle Beach, no. 16,574.

Euphorbia marilandica Greene (pubescent form). One plant only among scattered individuals of *E. Ipecacuanhae*, dry sandy roadside, 2 miles north of Myrtle Beach, no. 16,573.

Reported only from near the type locality in Anne Arundel Co., Maryland; there is, however, in the Gray Herbarium a fragmentary specimen collected near Augusta, Ga., *Olney and Metcalf*, no. 273, which apparently belongs here.

Euphorbia Ipecacuanhae L. Dry sand, 2 miles north of Myrtle Beach, nos. 16,571 (an upright, large-leaved state) and 16,572.

Cnidoscolus stimulosus (Michx.) Gray. Sandy pine barrens, rather common; our specimens from near Golf Club, Myrtle Beach, no. 16,570.

Callitriche palustris L. Emersed plants, prostrate on mud, marshes of Waccamaw River, Georgetown Landing, no. 16,575.

Ilex opaca Ait., f. subintegra Weatherby. Four miles south of Myrtle Beach, no. 16,578.

Ilex lucida (Ait.) T. & G. Woods 1 mile north of Little River, no. 16,582; border of swamp in pine-lands, Myrtle Beach, no. 16,577.

Ilex decidua Walt. Edge of river swamp, Conway, no. 16,579; river swamp, Longwood Island, Georgetown Co., no. 16,580.

Ilex vomitoria Ait. Rich woods south of Murrell's Inlet, Georgetown Co., no. 16,581.

Rather common, especially just along the coast.

Rhus quercifolia (Michx.) Steud. Roadside near Longwood Landing, no. 16,583.

Ampelopsis arborea (L.) Koehne. Woody, high-climbing vine, thicket at edge of river marsh, Georgetown Landing, no. 16,566.

Aesculus Pavia L. Rich bottom, Myrtle Beach, no. 16,584.

A conspicuous feature of the spring flora.

Helianthemum carolinianum (Walt.) Michx. Dry open woods, 2 miles south of Myrtle Beach, no. 16,585; sandy fields south of Murrell's Inlet, Georgetown Co., no. 16,586.

Viola affinis LeConte? Rich pine woods, south of Myrtle Beach, no. 16,590.

Viola septemloba LeConte. Sandy pine barrens, 5 miles south of Myrtle Beach, no. 16,593; rather small plants with leaves mostly three-lobed—the form described as *V. vicinalis* Greene and *V. insignis* Pollard. Low damp place in long-leaf pine woods, 2 miles north of Myrtle Beach, no. 16,588. Leaves with small basal lobes, otherwise uncut; flowers unusually large. *V. septemloba* appeared to be the commonest violet of the region.

Viola triloba Schwein.? Dry sandy pine woods, south of Myrtle Beach, no. 16,589.

Viola lanceolata L. Wet roadside ditch in pine-lands near Burgess P. O., no. 16,592; roadside ditch, 3 miles out of Socastee, no.

16,591 (pubescent form); pine-lands, 10 miles northeast of Georgetown, Georgetown Co., no. 16,587.

Our material seems definitely to belong with typical *V. lanceolata* rather than with var. *vittata*,[1] which differs only in its linear aestival leaves, subulate bractlets and narrowly lanceolate sepals. It is none too clearly distinguishable and seems best treated as a southern variety of *V. lanceolata*.

Opuntia humifusa Raf. Edge of road in sandy mixed woods, 2 miles south of Myrtle Beach.

A shade form with rather narrowly elliptic joints (see Britton & Rose, Cactaceae **1**: 128). In this respect it resembles *O. macrarthra* Gibbes; but a plant brought back and, through the kindness of Mr. Lazenby, brought to flower at the Harvard Botanic Garden, produced the characteristic blossom of *O. humifusa*.

Oenothera laciniata Hill. Sandy field south of Murrell's Inlet, Georgetown Co., no. 16,594.

Oenothera **subglobosa** (Small), n. comb., var. **arenicola** (Small), n. comb. *Kneiffia subglobosa* Small, Bull. Torr. Bot. Club **23**: 177 (1896). *K. arenicola* Small, Fl. s.e. U. S. 842 (1903). Recently burnt-over pine-lands near Burgess P. O., no. 16,595.

The plant of the Coastal Plain, represented by our specimens, differs from typical *Oe. subglobosa* of the Piedmont only in its longer and denser pubescence and is apparently best treated as a variety.

Myriophyllum heterophyllum Michx. Shallow water of artificial pond, Golf Club, Myrtle Beach, no. 16,596.

Spermolepis divaricata (Walt.) Raf. Sandy roadside, near Georgetown Landing, no. 16,597.

Lilaeopsis caroliniana Coult. & Rose. Shallow water of run and artificial pond, Golf Club, Myrtle Beach, no. 16,598.

Our collection of this very local ~~endemic~~ species of the coastal plain helps to fulfill Coulter & Rose's prediction that it would be found in the region intervening between the two localities known to them in 1900 and to Small in 1913—eastern North Carolina and Louisiana. In our young and mostly submersed material, the leaf-blades are not well developed and the fruit is immature, but the habitat of the plant in fresh water and the elongated leaves much exceeding the peduncles, place it definitely with this species.

Nyssa sylvatica Marsh. Banks of Waccamaw River, below Peach Tree, no. 16,601.

Nyssa biflora Walt. River swamp, Waccamaw River, Longwood Island, Georgetown Co., no. 16,603.

[1] Viola lanceolata var. **vittata**, n. comb. *V. vittata*, Greene, Pittonia 3: 258 (1898).

Apparently much less common than the other two species.

Nyssa aquatica L. Bank of Waccamaw River, opposite Sandy Island, no. 16,600.

Flowering one to two weeks later than *N. sylvatica.*

Cornus florida L. Dry mixed woods, 2 miles south of Myrtle Beach, no. 16,599.

One of the most abundant species of the Southeast, vying in numbers with such weeds as *Linaria canadensis.*

Rhododendron canescens (Michx.) Sweet. High shrub in rich bottom, edge of stream 3 miles north of Myrtle Beach, no. 16,606. Seen only here.

Rhododendron atlanticum (Ashe) Rehder. Low shrub in sandy woods, 5 miles south of Myrtle Beach, no. 16,605; dry pine-lands, 5 miles south of Conway, no. 16,604.

A frequent and characteristic plant of the pine-lands, often occurring in large colonies and attractive because of its large pink flowers which exhale a strong, carnation-like fragrance. First noticed in flower April 7, but not in full bloom till about the 20th.

Leucothoe racemosa (L.) Gray. Swampy bottom in rich woods near Socastee, no. 16,611; swampy border of Waccamaw River near Conway, no. 16,612; bank of the Waccamaw River near Bull Creek, no. 16,613.

The last two collections were remarkable for their extremely long racemes, up to 2.5 dm. In this respect they resemble *L. elongata* Small, but lack the technical characters of calyx, etc. on which that species is founded.

Leucothoe axillaris (Lam.) D. Don. Low thicket along stream, Myrtle Beach, no. 16,609; rich pine woods, Pine Island, no. 16,608.

Xolisma lucida (Lam.) Rehd. Roadside thicket, 2 miles north of Conway, no. 16,610; edge of swamp, 2 miles south of Myrtle Beach, no. 16,607 (extreme form with large, broadly elliptic leaves, rather lax branching and few flowers).

Gaylussacia frondosa (L.) T. & G. Dry sandy pine-barrens, Myrtle Beach, no. 16,614.

Vaccinium crassifolium Andrews. Prostrate and rooting at the nodes, the long shoots hanging over the sides of a roadside ditch, in pine-lands near Socastee, no. 16,622.

A peculiar plant, appearing to New England eyes like an enlarged edition of the creeping snowberry.

Vaccinium neglectum (Small) Fernald. Dry oak barrens, 4 miles north of Myrtle Beach, no. 16,615.

Vaccinium arboreum Marsh. Dry oak barrens, 4 miles north of Myrtle Beach, no. 16,617.

Vaccinium virgatum Ait. Moist soil in pine woods, 5 miles south of Myrtle Beach, no. 16,619 (fls. white).

Vaccinium virgatum Ait., var. tenellum (Ait.) Gray. Dry woods, 2 miles south of Myrtle Beach, no. 16,620 (fls. white); same locality, no. 16,620a (fls. pink); dry swampy pine barrens, 10 miles north of Myrtle Beach, no. 16,621 (fls. pink).

Low shrubs branched from the base only, mostly not more than 5 dm. high.

Vaccinium Elliottii Chapm. Alluvial woods along Waccamaw River, opposite Sandy Island, no. 16,616.

Vaccinium atrococcum (Gray) Heller. Dry sandy woods, 2 miles north of Myrtle Beach, no. 16,618.

Shrubs 1 m. high; flowers white or pinkish.

Styrax americana Lam. Waccamaw River bank below Longwood Landing, no. 16,627 (f. glabra J. Perk.); river swamp, Waccamaw River below Peach Tree, no. 16,628 (f. typica).

Symplocos tinctoria (L.) L'Hér. Small spreading tree, 5 m. high, in dry or moist mixed woods, Pine Island road, Myrtle Beach, no. 16,629.

Osmanthus americana (L.) Benth. & Hook. Hollows in sand dunes, Pawley's Island, Georgetown Co., no. 16,635.

Flowers with a faint fragrance of orange blossoms.

Chionanthus virginica L. Low woods, Longwood Landing, no. 16,625.

Gelsemium sempervirens (L.) Ait. f. Sandy pine barrens, Myrtle Beach, no. 16,626. Common.

Samolus parviflorus Raf. On brook-margins, 4 miles south of Myrtle Beach, no. 16,624.

Frequent in similar situations.

Asclepias humistrata Walt. Sandy oak barrens, 6 miles north of Myrtle Beach, no. 16,630.

Salvia lyrata L. Sandy roadside, 10 miles south of Myrtle Beach, no. 16,632.

Not common near the coast, much more so farther inland.

Lamium amplexicaule L. Sandy roadside, south of Murrell's Inlet, Georgetown Co., no. 16,631.

Gratiola virginiana L. (*G. sphaerocarpa* Ell.) Along brook, 2 miles south of Myrtle Beach, no. 16,633.

Flowers snow-white.

Pedicularis canadensis L., f. praeclara A. H. Moore. Rich bottom woods, 4 miles south of Myrtle Beach, no. 16,634.

Conopholis americana (L. f.) Wallr. Parasitic on oak roots, 2 miles south of Myrtle Beach, no. 16,623.

Bignonia capreolata L. Border of rich swampy bottom, 2 miles east of Conway, no. 16,636.

Utricularia subulata L. Roadside ditch in pine-lands, 3 miles east of Conway, no. 16,638.

Pinguicula elatior Michx. Wet pine barrens, Pine Creek, no. 16,637; near Burgess P. O., no. 16,639.

Plantago virginica L. Dry pine woods south of Myrtle Beach, no. 16,642; deep, loose sand of roadside, 1 mile north of Georgetown Landing, no. 16,640.

The latter collection with narrowly oblanceolate leaves.

Plantago elongata Pursh. Sandy field, Longwood Landing, no. 16,641.

Houstonia patens Ell. Sandy pine-barrens, Myrtle Beach, no. 16,646.

Flowers deep violet-blue.

Viburnum dentatum L. Waccamaw River, below Peach Tree, no. 16,644.

Viburnum rufidulum Raf. Rich woods, 2 miles south of Myrtle Beach, no. 16,643.

Lonicera sempervirens L. Roadside thicket, 3 miles south of Conway, no. 16,645.

Specularia perfoliata (L.) A. DC. Sandy bank at border of woods, Longwood Landing no. 16,647.

Erigeron quercifolius Lam. Roadside ditch, 2 miles north of Conway, no. 16,672; dry sandy field, Myrtle Beach, no. 16,649.

Erigeron vernus (L.) T. & G. Roadside ditches, 5 miles southeast of Conway, no. 16,651; wet ditch in pine barrens, south of Myrtle Beach, no. 16,668; wet pine barrens, 1 mile north of Little River, no. 16,673.

Gnaphalium spathulatum Lam. Roadside weed, Myrtle Beach, no. 16,669. Frequent.

Gnaphalium falcatum Lam. Dry sandy roadside, 4 miles south of Myrtle Beach, no. 16,655.

Gnaphalium purpureum L. Dry sandy field and roadside, Myrtle Beach, nos. 16,650, 16,666. Flowers pink.

Chaptalia semifloscularis (Walt.) Robinson. Moist depressions in pine-barrens, 2 miles north of Myrtle Beach, no. 16,654; moist pine-barrens, 10 miles southwest of Conway, no. 16,648. Flowers pale rose.

Chrysogonum virginianum L. Dry wood-margin and open woods at border of rich bottom, 4 miles south of Myrtle Beach, no. 16,653.

Helenium Nuttallii Gray. Damp pine barrens south of Myrtle Beach, no. 16,674; moist pine barrens, 10 miles south of Conway, no. 16,675.

Senecio glabellus Poir. Swamp 7 miles north of Conway, no. 16,667.

Arnica acaulis (Walt.) BSP. Pine-lands, 10 miles northeast of Georgetown, no. 16,652.

Cirsium horridulum Michx., var. Elliottii T. & G. Dry sandy roadside, 5 miles south of Murrell's Inlet, Georgetown Co., no. 16,676.

Very stout, hollow-stemmed plants about 8 dm. high; corollas purple.

Krigia virginica Willd. Dry loose sand along roadway, 4 miles north of Myrtle Beach, no. 16,671; roadside, south of Myrtle Beach, no. 16,670.

Pyrrhopappus carolinianus (Walt.) DC. Wet pine barrens, 1 mile north of Little River, no. 16,677.

One plant, the only one observed.

The following lists, embodying the results of a day and a half of roadside botanizing by the senior author, are appended not because they have any significant connection with the lists from Myrtle Beach, but because, in the absence of any recent detailed account of the flora of South Carolina, almost any exact record of locality may be of interest to the student of distribution.

Plants of the Sand-hills of Orangeburg and Lexington Counties south and west of Columbia.

Panicum oligosanthes Schult. Dry roadside south of the Congaree River opposite Columbia, no. 6112.

Danthonia sericea Nutt. Dry open woods near Pelion, no. 6128.

Carex Smalliana Mackenzie. By water-course in open, near Swansea, no. 6125. *compressicum Lam.*

Eriocaulon ~~decangulare~~ L. Open and shaded muddy places at crossing of Congaree Creek, south of Columbia, no. 6123.

Tradescantia rosea Vent. *Cuthbertia graminea* Small. Thin dry woods, south of the Congaree River opposite Columbia, no. 6116.

Nolina georgiana Michx. Dry pine woods near Swansea, no. 6127.

Just coming into flower; perhaps not certainly determinable without fruit, but apparently this species rather than the Floridian *N. atopocarpa* Bartl. According to Bartlett, Rhodora **11**: 80 (1909), records from South Carolina previous to that date rest only on the statement in Elliott's "Sketch."

Stipulicida setacea Michx. Dry pine woods near Pelion, no. 6132.

The thread-like scapes were almost invisible against the back-

ground of brown pine-needles which covered the basal rosette of leaves.

Arenaria caroliniana Walt. Dry pine lands north of Congaree Creek, no. 6117.

Silene caroliniana Walt. Dry open mixed woods, south of the Congaree River opposite Columbia, no. 6114.

Pubescent with long, matted hairs; radical leaves oblanceolate to broadly obovate, obtuse or mucronulate, the cauline oblong or linear-oblong, acute; petals white or tinged with pink; teeth of the glandular-viscid calyx red. This is apparently a pale-flowered phase of true *Silene caroliniana* Walt., which is described as with "foliis radicalibus tomentosis obtusis caulinis . . . acutioribus." Our specimens are well matched, except in color of flowers, by the following collections in the Gray Herbarium. South Carolina: Santee Canal, *Ravenel;* vicinity of Charleston, *B. L. Robinson*, no. 58. Georgia: near Waynesboro, Burke Co., *Harper*, no. 2075. The more northern, thinly pubescent plant with narrow, acute radical leaves, is *S. pensylvanica* Michx., and may well be varietally separable.

Lupinus diffusus Nutt. Wood-margin near Raymond, no. 6107.

Baptisia alba (L.) R. Br. Dry open woods near North, no. 6111.

Plants about 1 m. tall with long, slender spikes of white flowers, their keels tinged with greenish yellow.

Euphorbia gracilis Ell. Dry, thin woods, south of the Congaree River opposite Columbia, no. 6115.

A pubescent state, most of the plants seen with geometrically linear leaves, 2.5–3 cm. long and about 3 mm. wide, the sides precisely parallel and the apex abruptly truncate.

Euphorbia Curtisii Engelm. Dry pine woods, with *Stipulicida*, near Pelion, no. 6133.

A species rather well marked, in a difficult group, by its tiny involucres and nearly sessile capsules.

Viola pedata L., var. ranunculifolia (Juss.) Ging. ex DC. Prod. 1: 291 (1824). *V. ranunculifolia* Juss. ex Poir. Encycl. 8: 626 (1808). *V. digitata* LeConte ex Pursh, Fl. Am. Sept. 171 (1814). Open dry woods, south side of the Congaree River, opposite Columbia, no. 6113.

This variety, characterized by having leaves divided only to the middle, merely dentate or even entire, was carefully and well described by Poiret. The writers hope to discuss the variations of *V. pedata* in detail in a later paper.

Vaccinium caesium Greene. Dry mixed woods, near Raymond, no. 6108.

Styrax americana Lam. Low wet thicket near Swansea, no. 6124.

Amsonia ciliata Walt. Dry pine lands south of Columbia, no. 6120.

Phlox amoena Sims. Dry open woods near Pelion, no. 6130.

Phlox nivalis Lodd. Similar habitat, near North, no. 6109.

Lithospermum caroliniense (Walt.) MacM. Dry wood-margins near North, no. 6110.

Linaria canadensis L. Roadside south of Columbia, no. 6118.

In this region, as elsewhere in the southern coastal plain, a ubiquitous weed.

Utricularia inflata Walt. Shallow pond near crossing of Congaree Creek, south of Columbia, no. 6121.

Berlandiera pumila (Michx.) Nutt. Dry pine-lands, south of Columbia, no. 6119.

Rays clear yellow; disk-flowers deep wine-color.

Coreopsis lanceolata L. Dry, open woods near Pelion, no. 6131.

Marshallia obovata (Walt.) Beadle & Boynton. Dry pine-lands, near Swansea, no. 6127.

Senecio Smallii Britton. Dry, open woods, near Pelion, no. 6128.

Plants of the outer Border of the Piedmont, Saluda County.

In this region there is little topographic difference to mark the passage from the coastal plain to the piedmont. Both exhibit a series of low hills and ridges; the transition is from a sandy to a hard, reddish and clayey soil, with a corresponding change in flora. All the plants in this list were collected in dry, open mixed woods in the piedmont soil, above described. Habitat data are therefore not repeated under each number, but are to be understood for all.

Panicum depauperatum Muhl. Northwest of Saluda, no. 6142.

Potentilla canadensis L. (*P. pumila* Poir.). Northwest of Batesburg, no. 6134.

Baptisia bracteata Ell. Northwest of Saluda, no. 6140.

Psoralea pedunculata (Mill.) Vail. Northwest of Saluda, 6138.

Vicia caroliniana Walt. Climbing on low bushes, same locality as preceding, no. 6144.

Corolla white, tinged with lavender; calyx brownish-pink.

Oxalis violacea L. Northwest of Batesburg, no. 6137.

Corolla varying from pink to violet.

Phlox amoena Sims. Northwest of Saluda, no. 6138.

A form with linear, "somewhat acuminate" leaves, answering to the description of *P. Lighthipei* Small but apparently differing from no. 6130 only in the shape of the leaves.

Scutellaria parvula Michx. Northwest of Saluda, no. 6139.
Prunella vulgaris L., var. hispida Benth. Same locality, no. 6141.
Houstonia longifolia Gaertn. Northwest of Batesburg, no. 6135.
Hieracium venosum L. Same locality, no. 6136.

Leaves elliptic or obovate, cuneate-based, obtuse or acutish, 4–7 cm. long, the upper surface thinly but evenly hirsute with stiff white or yellowish hairs having dark papillate bases which give a puncticulate effect to the leaf when seen from above.

MOSSES OF SOUTHERN BRITISH HONDURAS AND GUATEMALA[1]

Edwin B. Bartram

The moss flora of Central America is an exceedingly rich one and still very imperfectly known. It is only by recording the additions from time to time, as they appear, that the groundwork for a comprehensive survey in years to come may gradually be laid.

The species listed below represent two small collections. One by Mr. J. J. White from the vicinity of Punta Gorda, British Honduras which was received through Dr. Carroll W. Dodge from the Missouri Botanical Garden and the other by Dr. J. Bequaert from the Departments of Solola and Chimaltenango, Guatemala, in connection with the Harvard Medical Expedition, which was sent by the Farlow Herbarium.

British Honduras

These collections are all labelled "Punta Gorda, British Honduras" and were collected by Mr. J. J. White in October and November 1932.

Fissidens hookeriaceus (C. M.) Par.
Fissidens Garberi Lesq. & James
Leucoloma Crugerianum (C. M.) Jaeg.
Octoblepharum albidum Hedw.
Calymperes Donnellii Aust.
Calymperes nicaraguense Ren. & Card.
Calymperes lonchophyllum Schwaegr.
Hyophila Tortula (Schwaegr.) Hampe
Mniomalia viridis (Mitt.) C. M.

[1] Published with aid to Rhodora from the National Academy of Sciences.

I have referred this last collection here with very little hesitation. The plants are more slender than those from South America but the agreement in every other detail is complete. No important distinction is suggested by the description of *M. Bernoullii* C. M. and I suspect that they are conspecific.

This must be an exceedingly rare and localized plant in Central America. In the numerous collections from this region that I have studied during recent years this is the first time the species has appeared.

Pireella cymbifolia (Sull.) Card.
Meteoriopsis remotifolia (Hornsch.) Broth.
Neckeropsis undulata (Palis.) Broth.
Neckeropsis disticha (Hedw.) Flsh.
Pilotrichum cryphaeoides Schp.

These plants appear to be inseparable from the last species which has previously been known only from Guadeloupe. They agree in every essential particular with a specimen in my herbarium named by Bescherelle, Duss No. 945. It is a rather curious coincidence that both this species and *P. spiculiferum* should share the marked costal structure which distinguishes them from most of their congeners.

Vesicularia amphibola (Spruce) Broth.

Guatemala

Dr. Bequaert advises me that all his mosses came from two localities in the temperate forests, as follows:

Mocá, a finca (or coffee plantation) reached from the R. R. station Guatalon (also the P. O.), Dept. of Solola. Altitude 3000 ft.

Sa. Emilia, a small finca depending from the plantation Pacayal, near the P. O. Pochuta, Dept. of Chimaltenango. Altitude 3200 ft.

From an accompanying sketch map these localities are shown to be about ten miles south of Lake Atitlan.

Breutelia jamaicensis (Mitt.) Jaeg. On shaded soil, Sa. Emilia, Feb., 1931.
Rhodobryum Beyrichianum (Hornsch.) Par. On rock in densely wooded, humid gorge, Mocá, April, 1931.
Pilotrichella pulchella Schp. On tree trunk, Mocá, April, 1931.
Papillaria Deppei (Hornsch.) Jaeg. On tree, Sa. Emilia, February, 1931.
Neckeropsis undulata (Palis.) Broth. Mocá, April, 1931.
Porotrichum cobanense C. M. Mocá, April, 1931.

Pilotrichum **spiculiferum** Bartr. sp. nov. Fig. 1. Caulis secundarius ad 7 cm. altus, bipinnatus. Folia caulis secundarii late ovata, acuta, concava, 1.1 mm. longa, 0.6 mm. lata; marginibus toto ambitu denticulata, inferne revolutis; costis attenuatis, ad medium evanidis, dorso laevis; cellulis firmis, papillosis, 5 μ latis, 10–15 μ longis. Folia perichaetialia 2.2 mm. longa, capsula vix exserta, ovalis, fusca, calyptra pilosa. Caetera ignota.

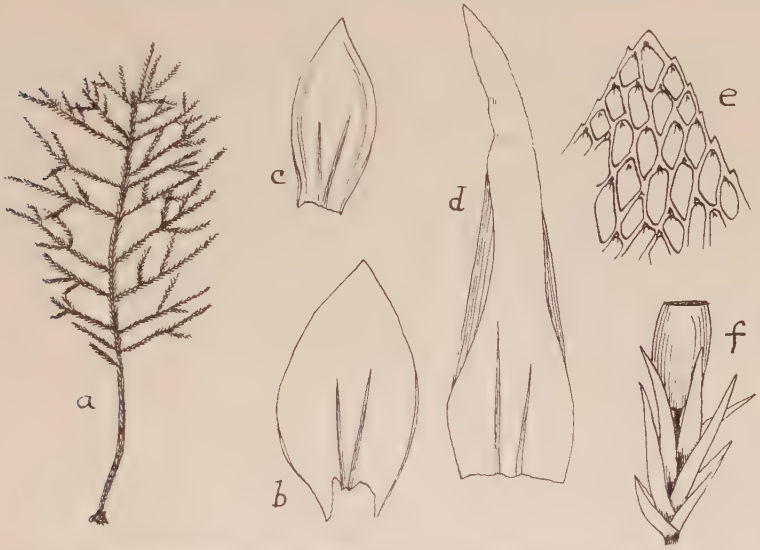

Fig. 1. Pilotrichum spiculiferum, n. sp. *a*, plant, × 1; *b*, stem leaf, × 27; *c*, branch leaf, × 27; *d*, perichaetial leaf, × 27; *e*, apex of branch leaf, × 400; *f*, capsule and perichaetial leaves, × 10.

Dioicous. Male plants resembling the sporophyte bearing plants; flowers numerous along the upper part of the stem and the upper branches. Rather slender plants, dull brownish green. Secondary stems up to 7 cm. long, bipinnately branched, the branches rigid and blunt at the tips; stem leaves broadly ovate, acute, slightly concave, decurrent, 1.1 mm. long by 0.6 mm. wide; margins narrowly revolute below, erect above, denticulate all around; costae slightly divergent, attenuate, ending a little more than half way up, usually entirely smooth on the back and vanishing in the lamina but sometimes projecting in a very minute prickle; leaf cells about 5 μ wide by 2–3 times as long, linear-rhomboidal, with firm but scarcely incrassate walls, papillose on both sides over the upper end of the lumen with short, sharp spicule-like papillae; branch leaves slightly smaller, more deeply concave. Inner perichaetial leaves longer and narrower than the stem leaves, up to 2.2 mm. long, costae short and weak, cells

sharply papillose; seta short, 1.5–2 mm. long, erect or slightly curved; capsule ovoid, 1.5 mm. long, slightly exserted, the tips of the perichaetial leaves reaching about half way up the urn; calyptra sparsely pilose (capsules all too old or very immature); spores papillose, 18–20 μ in diameter.

Type: on tree trunk, Mocá, Dept. of Solola, Guatemala, April, 1931, *J. Bequaert* No. 68.

Resembling *P. cryphaeoides* Schp. but more slender and bipinnately branched. The costae are also consistently shorter, the leaf cells more sharply and densely papillose and the capsules barely exserted above the tips of the perichaetical leaves.

The smooth, attenuate costae ending in the lamina and not or scarcely tipped with a spine or tooth on the back is a peculiar character in this genus that is shared by only two other species with which I am familiar, namely: *P. cryphaeoides* Schp. and *P. mexicanum* Ther. The frondose habit as well as the larger, sharply papillose leaf cells and the minutely denticulate, rather than sharply serrulate, upper margins will at once separate it from *P. mexicanum.*

Microthamnium laxulum Bartr. Mocá, on tree trunk, April, 1931.

Closely resembling the original collection from Costa Rica in habit and detail.

Polytrichum Antillarum Rich.

Bushkill, Pennsylvania.

Anychia canadensis in Hampshire County, Massachusetts.—For the past three or four years I have been interested in a colony of what I supposed might prove to be some member of the *Caryophyllaceae,* less than two dozen specimens by the side of a dirt road on the Holyoke Range in South Hadley, Massachusetts. Flowering specimens secured in 1933 were shown to Dr. Anderson of the Arnold Arboretum, who identified them as *Anychia canadensis* (L.) BSP.

So far as I can learn, this species has not been reported from Hampshire County. It has been collected nearby, however, in Franklin (Mt. Toby) and Hampden Counties. As far as my observation showed, the plant seemed to be restricted, in the locality found, to a narrow strip of tuffaceous earth, called Granby tuff (pH. 5.84) 1600 feet wide, extending lengthwise on the south side of the Holyoke Range. A few other isolated specimens have also been found near the Connecticut River on the southwestern edge of the Range; and here

again on Granby tuff. The plant is not found on the Triassic diabase talus-slopes nearby. The evidence seems to suggest that in this locality the species is restricted to the tuffaceous earth exclusively.

A specimen, checked by Prof. M. L. Fernald, has been filed in the Herbarium of the New England Botanical Club.—Albert L. Delisle, Biological Laboratories, Harvard University.

Epifagus virginiana (L.) Bart., forma **pallida**, n. f., planta omnino pallide brunnescens, nec rubro-tinctis, corollis albis supra pallidissime roseo-tinctis calicisque dentibus similiter tinctis exceptis.

Whole plant pale brownish, except for the white corollas very faintly tinged with dull pink above and the similarly tinged calyx-teeth.—Old beech and maple woods, Stratton, Vermont, *Una F. and C. A. Weatherby*, Sept. 3, 1933 (type, in Gray Herb.).

In the usual form of the species, the ground-color of stem and branches is much the same as in the form here proposed (nearly Ridgway's "tilleul buff"), but they are abundantly striate with narrow lines of brown madder.[1] The corolla is white laterally, with a broad stripe of brown madder extending its whole length above and a narrower stripe below. The calyx-teeth are also strongly tinted with the same color and the cleistogamous corollas and capsules spotted with it.

In f. *pallida* the madder pigment is wholly lacking except for a faint trace on the corolla above and on the calyx-teeth. It is quite analogous to *Corallorrhiza maculata*, f. *flavida* (Peck) Farwell, in which likewise a red pigment, normally present, is lacking and a yellow one, ordinarily masked by the red, gives the color to the plant.—C. A. Weatherby, Gray Herbarium.

An Additional Note on the Branching tendency in Polygonatum.—Since our publication of *Polygonatum pubescens* (Willd.) Pursh, forma *fultius* Fernald & Harris and discussion of similar forms of the European *P. multiflorum* (L.) All.,[2] Prof. J. A. Nieuwland has called our attention to *P. commutatum* (R. & S.) Dietr., forma *ramosum* McGivney.[3] This plant, found in the vicinity of Notre Dame, Indiana and near Lake Christiana, Michigan, is even more branching than our form of *P. pubescens*. Prof. Nieuwland writes that the

[1] I here follow the careful color nomenclature of Schuyler Mathews's Field Book of American Wild Flowers.

[2] M. L. Fernald and S. K. Harris, Rhodora, xxxv. 403–406 (1933).

[3] Sister Vincent De Paul McGivney, Am. Midland Nat. ix. 663, 664 (1925).

flowers of *P. commutatum*, forma *ramosum* are perfect and that the plants set seed every year, thus differing from the forms of *P. multiflorum* and from what appears to be the case in *P. pubescens*, forma *fultius*. No indication is given in the description of the form that it was found growing in a locality which had recently been disturbed.—M. L. Fernald and S. K. Harris, Gray Herbarium.

Moss Flora of North America.[1] Another part (*Grimmiaceae*) of Grout's Moss Flora has appeared. The text is almost entirely the work of Mr. Jones although Dr. Grout has edited it and contributed an "Artificial Key to the Grimmiaceae." Eight genera are described: *Glyphomitrium* with 1 species, *Grimmia* with 47 species and 22 varieties and forms, *Scouleria* with 2 species, *Braunia* with 2 species, *Hedwigia* with 1 species and 5 forms, *Campylostelium* with 1 species, *Ptychomitrium* with 5 species, and *Rhacomitrium* with 9 species and 9 varieties and forms. There are 25 excellent plates figuring about 63 species and varieties. As in earlier parts most of these illustrations are reproduced from many different sources: e. g., Bryologia Europaea, The Bryologist, Sullivant, Engler and Prantl, Bulletin of the Torrey Botanical Club, Braithwaite, etc. There are 7 original illustrations by Mr. Seville Flowers and 1 by Miss E. L. Curtis. Seven species apparently have never previously been illustrated: these are, *Glyphomitrium canadense*, *Grimmia atricha*, *G. coloradensis*, *G. hamulosa*, *G. heterophylla*, *G. Moxleyi*, and *Ptychomitrium Gardneri*. About a dozen species figured in Grout's "Mosses with Hand-lens and Microscope" are not here re-illustrated. There are several new combinations and one description of a new form—*Grimmia alpicola* var. *rivularis* f. *papillosa*. A minor criticism is the lack of uniformity in the use of italics in listing "Exsiccati." Text and plates are of the same high grade as in all earlier parts. The publication is indispensable to active students of North American Grimmiaceae.—J. F. C.

[1] *Moss Flora of North America, north of Mexico. Grimmiaceae* by George Neville Jones, M.Sc., edited by A. J. Grout, Ph.D. Vol. II, pt. 1, pp. 1–65, plates I–XXV. Published by A. J. Grout, Newfane, Vt., Nov., 1933.

Volume 36, no. 421, including pages 1 to 24, 2 portraits and 3 plates, was issued 5 January, 1934.

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